

Amendments to the Drawing(s)

The attached drawing sheets replace the Figures as originally filed. With regard to these sheets, Applicants maintain that no new subject matter has been added. Figure 3 has merely been removed from sheet 1 of the drawings and included on a separate sheet in order to place the figures in sequential order. More specifically, the amendments made are as follows:

For the original first sheet of drawings: Original Fig. 3 has been removed from this page and placed on a separate sheet.

For the original second sheet of drawings: No amendments have been made.

For the new third sheet of drawings: Original Fig. 3 is now included on this separate drawing sheet.

The pages have also been renumbered accordingly.

Attachments: Replacement Sheets

REMARKS / ARGUMENTS

Disposition of the Claims

The present response is intended to be a full and complete response to the non-final Office Action mailed December 27, 2008. Claims 16 to 17, 19 to 22 and 24 to 29, as amended, and newly added Claims 30 to 31 are pending in the present application. Claims 1 to 14 were cancelled in a preliminary amendment. Claims 18 and 23 have been cancelled in the current response. Applicants respectfully request continued examination of the present application and allowance of the pending claims.

Amendments to the Claims

Claim 15 has been cancelled and redrafted as newly added Claim 30. Claims 16, 17, 24, 26, 27 and 28 have been amended to depend upon newly added Claim 30 rather than cancelled claim 15. Claims 18 and 23 have been cancelled since the content of these claims has been incorporated into newly added Claim 30. Claim 31 has been added as a new independent claim. Applicant maintains that support for these newly added claims may be found in the cancelled claims as well as paragraph [0011] of the present application. Pending Claims 19 to 22, 25 and 29 have not been amended in the current response.

35 U.S.C. § 102 Rejection

The Examiner rejects Claims 15, 16, 17, 23 and 28 under 35 U.S.C. § 102(a) as being anticipated by Van den Syde, U.S. Patent Publication 2002/0104589 (hereinafter "Van den Syde"). As noted above, Claim 15 has been cancelled and redrafted as newly added Claim 30 which also incorporates the content of Claim 23. Accordingly, this rejection is respectfully traversed with regard to Claims 16, 17 and 28, as amended, and newly added Claims 30 to 31.

Newly added Claim 30 includes the content of now cancelled Claim 18 which was not rejected by the Examiner under 35 U.S.C. § 102(a). In view of the

incorporation of the content of Claim 18 into newly added Claim 30, Applicants maintain that newly added Claim 30 and the claims which depend therefrom (Claims 16, 17 and 28, as amended) are not anticipated by Van den Syde. In addition, newly added Claim 31 is also not anticipated by Van den Syde since newly added Claim 31 also contains the content of now cancelled Claim 18, as well as the content of Claim 25, which the Examiner also did not rejected as being anticipated by Van den Syde.

In view of the above, Applicants respectfully maintain that Claims 16, 17 and 28, as amended, and newly added Claims 30 and 31 are not anticipated by Van den Syde and respectfully request the withdrawal of the 35 U.S.C. § 102(a) rejection.

35 U.S.C. § 103(a) Rejection

The Examiner rejects Claims 18 to 22 and 24 to 29 under 35 U.S.C. § 103(a) as being unpatentable over Van den Syde in view of Wandke, EP Patent 1050592 (hereinafter "Wandke"). As noted above, Claim 18 has been cancelled and its content incorporated into newly added Claims 30 and 31. Accordingly, this rejection is respectfully traversed with regard to Claims 19 to 22 and 24 to 29, as amended, and newly added Claims 30 to 31.

The Examiner maintains for a variety of reasons that the invention set forth in the above noted claims would have been obvious to one skilled in the art considering Van den Syde in view of Wandke. Applicants respectfully disagree since Van den Syde and Wandke, whether considered individually or in combination, would not have led one of skill in the art to pick and choose among the various disclosures of Van den Syde and Wandke in order to achieve the present invention.

The present invention is directed to a method for rapidly cooling metal parts using a pressurized cooling gas mixture. As noted in the present application, while a number of prior approaches have been utilized, these prior attempts were all based on attempts to improve the convective heat transfer in the treatment center.

Applicants have now found that by using a cooling gas mixture which comprises one or more specific infrared radiation absorbing gases selected in such a manner as to improve the thermal transfer to the part by combining the radiative and convective transfer in order to optimize the convective transfer coefficient. The infrared radiation absorbing gases are selected from saturated hydrocarbons, unsaturated hydrocarbons, CO₂, CO, H₂O, NH₃, NO, N₂O and mixtures of two or more of these gases.

Van den Syde discloses a process and apparatus for recycling a quenching gas to be used with a treating gas for treating components in an atmospheric furnace. In the process of Van den Syde, the component to be treated is placed in an atmospheric furnace along with a treating gas. The heat treated component is then fed into a quenching chamber along with the treating gas. At this point, a quenching gas is added to the chamber. Once quenching occurs, all of the gas is removed from the chamber and the treating gas and quenching gas are separated to provide a purified quenching gas. The quenching gas is then recycled back to the quenching chamber. In the specification, Van den Syde discloses a variety of possible treating gases—methane, carbon monoxide, nitrogen, propane and butane. In addition, Van den Syde indicates that the quenching gas comprises at least one gas selected from helium (preferably as the main component) and nitrogen, argon and carbon monoxide (preferably as the minor component).

The Examiner relies upon Wandke for the teaching that 1) metal heat treating with quenching, 2) the use of carbon dioxide as a quenching gas and 3) various volumes of absorbing gas.

Neither Van den Syde or Wandke teach or suggest that by using the specific gases set forth by the Applicants it is possible to achieve the advantages set forth in the present application.

In the Office Action, the Examiner states that with regard to Claims 18 to 22, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Van den Sype with the adjustment of the composition so the mixture density is substantially equal to that of nitrogen. Applicants respectfully disagree. Van den Sype does not address density of the gas mixture. In addition, Van den Sype provides a listing of gases without any motivation to pick and choose specific gases from among the gases disclosed by Van den Sype and then adjust these gases to achieve a density that is close to that of nitrogen.

Furthermore, the Examiner states with regard to Claim 28 that Van den Sype teaches a very similar process of recycling a gas mixture in which only the recycled gas is recompressed prior to a subsequent use. Although Van den Sype does disclose a recycling process, this alone does not overcome the failure of Van den Sype to provide some motivation to utilize the specific gases disclosed by Applicants or to adjust the gases to achieve a density that is close to that of nitrogen.

The Examiner also states with regard to Claim 22 that while Van den Sype fails to teach the use of CO₂, Wandke teaches the use of carbon dioxide as a quenching gas for metal heat treatment. Applicants maintain that while Wandke does teach the use of carbon dioxide, this teaching does not overcome the deficiencies of Van den Sype.

With regard to Claims 24 to 27, the Examiner states that while Van den Sype fails to teach the volume % of the absorbing gas in the mixture, Wandke teaches an example in which the absorbing gas is 50% of the total mixture volume and also combinations with the reactive gas composing up to 50% of the total volume. Even so, Applicants maintain that this still does not overcome the deficiencies of Van den Sype.

Concerning Claim 29, the position of the Examiner is that Wandke teaches metal heat treatment comprising quenching and it would have been obvious to adjust the composition of said cooling gas so that significant later changes to the apparatus are unnecessary and also it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Wandke with the adjustment of the composition of said cooling gas in order to increase efficiency in production. Applicants disagree. While Wandke does teach metal heat treatment that comprises quenching, the obvious modifications suggested by the Examiner do not flow from the teachings of Van den Syde and Wandke. The incidental disclosure of various gases within a broader list of gases is not sufficient to render claims unpatentable. There is no approach in either Van den Syde or Wandke as to choice of gases, selection of conditions or optimization of conditions taught in prior art references. Therefore, it cannot be said that the present invention is obvious when considered in view of these prior art references.

CONCLUSION

Applicants believe that Claims 16 to 17, 19 to 22 and 24 to 29, as amended, and newly added Claims 30 to 31 are now in condition for allowance. Early notice to this effect is earnestly solicited. Should the Examiner believe a telephone call would expedite the prosecution of the present application, she is invited to call the undersigned attorney at the number listed below.

Applicants do not believe that any additional fee is due at this time. However, in the event that any additional fees are due, the Commissioner is authorized to debit deposit account number 01-1375 for the amount due.

Respectfully submitted,



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